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AUTHOR Mosvick, Roger K.
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ABSTRACT

A communication activities audit was completed by managers and technicians (N=213) from four high technology industries in a study conducted to examine the scope and kinds of communication activities of these professionals. Respondents' responsibilities ranged from lower middle-management/technical professional to senior-level management/technical professional. The amount of general activities in which these respondents estimated they were involved each week was on the high side compared with findings of similar surveys taken in other environments. They reported that they were engaged in business related types of communication for approximately 83% of their working day, presumably spending the other 17% in nonbusiness, social, or personal activities. The dominant mode of communication for this group was oral communication of various kinds, in which they spent two-thirds of their total communication time, compared to one-third spent working in a written communication mode (writing, reading, or analyzing documents.) While interpersonal communication was ranked as most important to their jobs, the two activities that accounted for the least amount of time--small group communication and managerial and technical presentations--were ranked second and third in importance. (HTH)

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COMMUNICATION PRACTICES OF MIDDLE MANAGERS AND TECHNICAL PROFESSIONALS IN FOUR LARGE-SCALE HIGH-TECHNOLOGY INDUSTRIES

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Roger K. Mosvick
Macalester College

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Communication specialists who study or work in large-scale organizations are ever needful of accurate, current data on communication practices within those organizations. Communication managers in business, government, and the professions require such data to evaluate appropriate communication strategies properly, to assess training needs, and to compare the cost-effectiveness of alternate practices as they relate to decision-making and overall corporate profitability. Their academic counterparts use the same data to inform their teaching strategies in preparing students for organizational careers and in developing curricula to this same end.

It is particularly important to assess communication practices in those organizations on the leading edge of the post-industrial revolution: large-scale technologically intensive industries. These organizations are often described as complex, highly specialized, interdependent, and decentralized information environments driven by a computer and by computer-based technology. Their work force provides another distinctive characteristic: highly-educated scientists and engineers, or technical, financial, and business professionals who comprise a diverse source of managerial and technical leadership.

It is within these types of organizations and populations that we are likely to uncover major changes in traditional organizational communication

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patterns and practices. Electronic, data-processing, and aero-space industries have often been architects and/or early adopters of the latest communication systems. The more collegial work styles and innovative management approaches of their professional work force may facilitate other shifts in communication practices.

We obviously need to develop a better picture of the total communication practices of this influencial group within these trend-setting organizations. However, the data from studies of high-technology industries are meager and at times contradictory, when compared to data from studies done in general business organizations. The relative importance of oral presentations is a case in point. In the early 1970s, Zollitsch and Krusing [1] found that the 300 presidents of small and large firms which they surveyed ranked communication skills first in order of importance among skills expected of graduates. In a similar survey, Bennett [2] found the 35 top executives in large California corporations all reported using the medium of oral presentations. In 1976, DiSalvo et al [3] reported responses to a survey of 170 recent graduates working in general business organizations. One key question asked them to rank the five most important communication skills judged important to job success, based upon their job experience. Public speaking was ranked dead last out of ten activities on this question. More recently, Hanna [4] surveyed 55 chief executive officers of large and small businesses concerning communication skills which would be needed by career-oriented students. Among other conclusions, Hanna recommended that less emphasis should be placed on formal presentations.

Two studies of scientific and technical personnel in more technology-intensive organizations present a somewhat different picture of the

importance of oral presentations. Erickson [5] surveyed the on-the-job communication skills of 133 technical graduates working in Midwestern industries. He found that technicians spent 30% of their time in oral communication, 6% of their time on business letters, 11% of their time writing technical reports, and 10% of their time reading technical articles. Approximately 50% of their reserach work was spent in reporting: half in oral reporting and half in written reporting. In 1980, Fitch [6] examined the oral communication skills needed by 79 young scientists in petroleum, chemical, and biological research institutes and in contract research groups. Of the top eight skills identified, four had to do with public speaking (formal paper presentation with use of visual aids, instructing/teaching techniques, public speaking before a large group, formal paper presentations without use of visual aids, and two skills related to small group work (small group techniques: participating in small groups or conferences, and discussion leadership: chairing small informal problem-solving meetings.)

Similar questions can be raised about a number of other communication practices: the relative importance of written versus oral communication, of horizontal and cross-level communication versus vertical communication, of formal versus informal channels of communication. The following survey is a modest contribution toward attempting to answer some of these questions.

PROCEDURES

To assess the scope and kinds of communication activities of representative populations of our target group, a communication activities audit was developed. The audit consisted of a four-page questionnaire of

fifteen forced-choice and open-ended questions dealing with general communication activity and four more specificed communication activities: managerial/technical presentations, small group conferences, person-to-person communication, and organizational communication. In addition, the following demographic information was requested: formal education completed, work experiences (in total, for the present company, and in their present position), their job title and main job duties, their job category (research and development, financial/accounting, manufacturing, marketing, sales, quality/process materials controls, administrative, or other), their job level (senior executive or senior scientist, upper middle management or technical professional, middle management/technical professional, or lower middle management/technical professional). The initial questionnaire was based upon an earlier exploratory study of selected aspects of organizational communication in one division of a large Midwestern high technology corporation.[7] In constructing the questionnaire, two approaches were emphasized: (1) to derive questions from the specific context and experiences of typical personnel in a large high-technology company which would later be surveyed, and (2) to make questions of communication practices as "event" or "task" centered as possible rather than to adopt more general categories such as "advising" or "persuading" which might be suitable for inquiries at a broader range of organizations than in the electronic, aero-space, and computer companies surveyed.

The initial six-page questionnaire was reviewed by four communication consultants and three training managers who were intimately knowledgeable about three or four survey sites and who were also experienced in communication training and survey methods. This resulted in the subsequent deletion and/or

revision of some items and a shortening of the questionnaire. The revised questionnaire was then administered to two pre-test groups in two of the companies later surveyed, after which individuals were interviewed for suggested revisions. This resulted in further deletion of a number of questions dealing with teleconferencing and computer conference activities which were found to be generally too infrequent to warrant inclusion. The final questionnaire administered was clearly less "future-oriented" and more traditional than first envisioned, as well as being more event-structured, following the recommendations of the pre-test group of managers and technical professionals.

The questionnaire was administered over an eighteen-month period from February, 1981, to September, 1982, to managers and technical professionals who were enrolled in two-day workshops or five-week communication courses instructed by Mosvick and Associates. The population was drawn from four large-scale, Fortune 500, high-technology industries which sponsored the training courses. The companies were headquartered in Minnesota and California from which most data were gathered, but some data were gathered from subsidiaries of these companies in other parts of the United States. The four companies included the electronics division of a major United States defense industry, a company specializing in large scientific computers and educational services, a company specializing in computers and control systems, and a large multi-product company marketing some 50,000 products. The target population within these companies was designated as "Middle Management and/or Technical Professional," denoting that no distinction was made as to whether the respondent was or had been on the "technical ladder" or the "management ladder." These job categories were considered to be so similar that

distinctions were made only at the level of managerial or technical responsibility. (It is the author's view, after working for 25, 15, 10, and 4 years, respectively, in each of these industries, that these distinctions become increasingly blurred as individuals are promoted in high-technology industries. The communication practices of a typical project manager appear to be quite similar by whatever managerial or technical career path he or she takes to arrive at that position.)

During 1981 and 1982, the questionnaire was administered to 229 respondents in these four companies, and sixteen responses were later found to be so incomplete that they were discarded for final analysis, resulting in a final N of 213. Over half the respondents (135) came from one company with 13, 47, and 18 responses from the other three companies, giving a disproportional influence to respondents of the large multi-product company. Later analysis, however, indicated that there were only minor differences on any background or communication activity variables because of company affiliation. A simple program was developed for tabulation and correlation analysis of all numerical and forced-choice questions. Responses to open-ended questions referring to presentation problems and meeting problems were content analyzed and categorized for frequency counts. The questionnaire was administered to each group with brief oral instructions which requested anonymity by asking respondents to delete their names and which clarified some of the questions (e.g., percentage of time in each case referred to time spent within a typical eight-hour work day; ranking order defined as 1=most important and 6=least important; etc.).

RESULTS

Background Information

Data on formal education completed revealed a generally high educational level with no significant differences among the four populations. One exception surfaced: a proportionately greater number of Ph.D. degrees held by individuals in the Research and Development job category. A summary of the data on education showed the following:

TABLE 1

FORMAL EDUCATION COMPLETED

(N=219)

Educational Level	Percentage of Total N	N
High School	1.0%	2
1-2 yrs College or Technical School	7.3%	16
B.S./B.A.	47.0%	103
M.A./M.S /M.B.A.	26.9%	59
Ph.D.	17.8%	39

In terms of work experiences, the average number of total years worked was 12.6 years; the average number of years worked for the present company was 9.2 years; the average number of years worked in the present position was 2.6 years. One may conclude that these data are not drawn from people in entry level positions but from fairly experienced, somewhat older managers and technical professionals, likely representatives of the broad band of middle

management.

The breakdown in job category assignments reveals the strong technical orientation of this group:

TABLE 2

JOB CATEGORY

(N=226)*

Job Category	Percentage of Total N	N
Research and Development	48.0%	108
Financial/Accounting	2.7%	6
Manufacturing	13.8%	31
Marketing	9.3%	21
Sales	.9%	2
Quality/Process Materials Control	9.8%	22
Administrative/Staff	15.6%	35

*The higher N indicates that some respondents checked more than one category.

More than 70% of the total population worked in job categories which were essentially technical in nature: research and development, manufacturing, quality/process materials controls. There was no significant variation in these data from company to company.

The level of managerial and technical responsibilities noted also indicated a generally representative profile of a typical organizational

hierarchy.

TABLE 3

LEVEL OF MANAGERIAL/TECHNICAL RESPONSIBILITY

(N=213)

Job Level	Percentage of Total N	N
Senior Executive/Senior Scientist	9.9%	21
Upper Middle Mgt/Technical Professional	10.3%	22
Middle Mgt/Technical Professional	29.3%	56
Lower Middle Mgt/Technical Professional	53.4%	114

GENERAL COMMUNICATION ACTIVITY

1. In this area, we sought to examine the comparative amount of time each individual spent on six different types of general communication. The categories were generally representative of the major types of task-oriented communication found in these types of organizations. In two related questions, respondents were asked to estimate the average percentage of time they spent each week in each of the communication activities listed (1.1) and to rank the importance of skills involved in the communication activities listed to their job (1.2). The results are as follows:

TABLE 4

AVERAGE PERCENTAGE OF TIME AND COMPARATIVE RANK OF IMPORTANCE

(N=208)

Communication Activities	Percentage of Time	Average Rank	Rank
Preparing for & making managerial & technical presentations	5.5%	3.4	3
Preparing for & engaging in small group meetings of 3 or more people	12.4%	3.0	2
Making Business-related telephone communications	12.3%	3.8	5
Engaging in business-related person-to-person communications	24.3%	2.0	1
Reading, reviewing mail & other documents	14.3%	4.5	6
Writing, dictating letters, documents, papers	14.1%	3.6	4
TOTAL	83.0		

When these data are broken down by job levels, a significant variation appears in only one job level, upper middle management, who display a different profile than do the other levels. Upper middle managers give nearly twice as many presentations and engage in more small group meetings, but use the telephone less and engage in fewer reading and writing activities than do the other managers or technical professionals at the other three levels.

In an attempt to get a better picture of each person's business communication activity, a third question asked how many Breakfast/Luncheon/Dinner or After-Hours business-related meetings they engaged in each week and the average length of those meetings: The results indicated that the average

manager or technical professional engaged in .76 meetings of this type each week which lasted for an average of 59 minutes. As might be expected, when this question was broken down by job level, one finds people at the senior level attending approximately twice as many business-related meetings after hours or accompanying meals as do personnel at other levels.

MANAGERIAL AND TECHNICAL PRESENTATIONS

The second question dealt with managerial and technical presentations. This activity was broken down into six types of presentations found to be most typical of presentation activity among technical professionals or managers in these high technology industries.

2.1 Respondents were asked to indicate the number and average length of the various types of presentations listed which they engaged in each month. The results were as follows:

TABLE 5

AVERAGE NUMBER AND LENGTH OF PRESENTATIONS EACH MONTH

(N=208)

Type of Presentation	Number/Month	Average Length in Minutes
Program reviews (program, project, budget reports, quarterly & mid-year reviews, etc.	2.1	28.0
Internal sales (persuading boss/others to adopt new programs, budgets, projects, etc.	2.2	25.8
External sales (persuading clients outside company to buy goods/services	.6	32.1
Demonstrations, product or technical (either "in-house" or "road-show" variety)	.7	29.8
Scientific papers/speeches to professional Associations	.3	33.6
Speeches to social, educational, layman groups outside company	.5	33.2

As can be seen, the two most frequent types of presentations given each month by this group were the program review and the internal sales presentation, both of which averaged more than two a month. These types of presentations were three times more likely to be given by this group than were the next most frequent category, the demonstration speech. A breakdown of the data by job category and job level supported conventional expectations. Marketing and sales personnel presented approximately three times as many internal and external sales speeches as did people in other job categories. Only one-fourth of these respondents, mostly research and development personnel, presented scientific papers or speeches to their professional associations, although at infrequent intervals. Slightly more than one-fourth of this group made speeches to groups outside the company. Senior executives and senior scientists did not engage in more of these types of presentations than did personnel in the other three job levels.

The average length of each of these presentation types was surprisingly uniform. Although some product demonstrations and scientific papers were reported to exceed one hour, the average for all types of presentations was approximately thirty minutes.

2.2 The second questions in this area dealt with presentation problems. Respondents were asked to describe briefly the two most bothersome problems to "you personally" concerning all types of presentations which they must make. Respondents mentioned 290 problems, consisting of 43 different types. Five types of presentation problems which constitute 50% of the problems mentioned are listed in descending order of importance:

TABLE 6

TYPES OF PRESENTATION PROBLEMS

(N=290)

Rank	Type of Problem	Frequency Mentioned
1	Anxiety/Nervousness during presentation	57
2	Organizing material for presentation	31
3	Insufficient time given to prepare presentation	27
4	General difficulty in preparation	19
5	Maintaining audience's attention	18

SMALL GROUP CONFERENCES

The third question dealt with small group conferences. The first sub-question asked respondents to indicate the number and average length of the various types of small group managerial or technical conferences of three or more people which they engaged in each week. The results are as follows:

TABLE 7

AVERAGE NUMBER AND LENGTH OF VARIOUS SMALL GROUP CONFERENCES EACH WEEK

(N=208)

Type of Meeting	Number per week	Average Length in minutes
Staff Meetings (administrative meetings with supervisors & peers)	1.5	57
Policy Meetings (determining new policy/programs for your work units)	.7	48
Problem-Solving Meetings (Solving problems in implementing programs in your area)	2.3	50
Interdepartmental Meetings (coordinating program activities with colleagues in other departments, work groups, or scientific disciplines)	1.5	60

As the data indicate, the two most frequent meetings for this respondent group in order of importance were the problem-solving meetings which were nearly twice as frequent as were staff meetings or interdepartmental meetings. The average length of all meeting types was from fifty to sixty minutes. The meeting categories seem to have matched this group's interpretation of major types since fewer than 1% of respondents noted other types, such as

brainstorming. Of interest was the fact that there were no significant differences in either number or length of meetings when the data were broken down by job category or job level.

3.1 The second sub-question in this area asked respondents to make a global judgment concerning the overall efficiency of these small group conferences. Specifically, respondents were asked: "Considering all the various types of meetings you attended last year, please estimate the overall efficiency of those conferences in meeting the goals or objectives of the meeting within the time allotted for the meeting." Respondents were asked to circle an appropriate percentage judgment on an eleven-point scale, ranging from inefficient=0% to efficient=100%.

3.2 The third sub-question in this area asked respondents to make a slightly different global judgment concerning their level of satisfaction with these meetings. Specifically they were asked again to consider all types of meetings attended last year and to estimate their average level of satisfaction with the meeting process outcomes, using the same scale. The average judgment of meeting efficiency and of meeting satisfaction is reported below, broken down by job level and job category.

TABLE 8

AVERAGE ESTIMATE OF MEETING EFFICIENCY AND MEETING SATISFACTION BY JOB LEVEL

(N=213)

Job Level	Average Judgment of Meeting Efficiency	Average Judgment of Meeting Satisfaction
Senior Executive/Senior Scientist	50%	50%
Upper Middle Mgt/Technical Professional	49%	46%
Middle Manager/Technical Professional	47%	47%
Lower Middle Mgt/Technical Professional	45%	44%
ALL LEVELS	47%	47%

TABLE 9

AVERAGE ESTIMATE OF MEETING EFFICIENCY & MEETING SATISFACTION BY JOB CATEGORY

(N=213)

Job Category	Average Judgment Meeting Efficiency	Average Judgment Meeting Satisfaction
Research and Development	48%	48%
Financial/Accounting	68%	58%
Manufacturing	42%	43%
Marketing	45%	39%
Sales	60%	23%
Quality/Process Material Controls	43%	49%
Administrative	44%	50%

Perhaps the central inference from these data is the generally low level with which both meeting efficiency and meeting satisfaction is viewed by all persons in all job levels and job categories (47%). There are no significant differences among estimates given by groups in different job categories or at different levels, although there is a slight tendency for the persons in the highest job level to view both meeting efficiency and meeting satisfaction more favorably than do persons in the lower two job levels. Judgments of meeting efficiency and of meeting satisfaction tend to correlate higher for persons at all job levels and in most job categories. This is an expected outcome since the two questions are likely closely associated in most task oriented organizations. In high technology settings, inefficient meetings usually translate into low meeting satisfaction.

3.3 The third sub-question in this area dealt with meeting problems. Respondents were asked to describe briefly the two most bothersome problems to "you personally concerning the business conferences and meetings which you attend." Respondents mentioned 335 problems representing 36 different meeting problem types. The five types of meeting problems which constituted 60% of the responses are listed in descending order of importance:

TABLE 10

MOST FREQUENT MEETING PROBLEMS

(N=335)

Rank	Type of Problem	Number
1	Getting off the subject	57
2	Meetings are too lengthy	46
3	Meetings have no goals or agenda	42
4	Meetings are disorganized	29
5	Meetings are inconclusive	28

PERSON-TO-PERSON COMMUNICATION

The fourth general question dealt with Person-to-Person Communication. The first sub-question asked respondents to indicate the average number and length of various types of job-related person-to-person meetings they engaged in each week with their supervisors, subordinates, peers, and others. The results are as follows:

TABLE 11

AVERAGE NUMBER AND LENGTH OF PERSON-TO-PERSON MEETINGS EACH WEEK

(N=208)

Type of Person-to-Person Communication	Number Each Week	Average Length in Minutes
Job instructions, planning, coordination, and feedback	10.2	22.8
Responding to work-related grievances, gripes, criticism, lack of motivation	2.2	21.2
Giving career counseling and guidance/ management development	.8	28.7
Interviewing prospective job candidates	.5	36.6
Job performance appraisals (mid-year, annual, or shorter term)	1.3	41.1

The data indicate that the most typical type of person-to-person communication this group engaged in each week was in both of the first two categories: job instructions, planning, coordination and feedback, and responding to work-related grievances, gripes, criticism, or lack of motivation. Second, these respondents spent considerably less time each week engaged in the other three types of person-to-perosn communication. On average, they engaged in some type of career counseling or management development guidance interaction less than once a week, in interviewing prospective job candidates about once every two weeks, and in job performance appraisals once every week.

The interaction with supervisors, subordinates, and peers in these first two categories was approximately twice a day, but for somewhat shorter periods of time of about 22 minutes for each meeting. The other meetings, though fewer in number, were longer than were the first two categories, averaging from 30 to 40 minutes each in length. Fewer than 1% of the respondents mentioned other types of meetings not included in these categories, the most frequently mentioned meetings being "planning company sponsored social events," "socializing," and "just talking about sports, non-business topics."

ORGANIZATIONAL COMMUNICATION

The last series of questions dealt with various issues of organizational communication.

5.1 The first sub-question asked respondents to estimate the degree of formality at each level by estimating "the extent to which the formal chain of command channels were followed at all levels" by responding to an eleven-point scale, ranging from 0=Little to No Formality to 10=Highly Formal. The results are as follows:

TABLE 12

ESTIMATE OF DEGREE OF FORMALITY

IN FORMAL ORGANIZATIONAL COMMUNICATION CHANNELS AT VARIOUS LEVELS

(N=213)

	Average Estimate
Departmental Level	52%
Divisional Level	68%
Company Level	77%

The most general conclusion emerging from these data is that the estimates of formality follow conventional wisdom about hierarchical structures: the larger, more distant the organizational unit being assessed, the greater the degree of formality perceived. There were no significant variations among companies on any of the Job Level or Job Responsibility categories.

5.2 The second sub-question of this area asked each respondent to make a global judgment of "how efficient their organization was in getting important information from the top down to their level." Respondents checked an appropriate estimate on an eleven-point scale, ranging from 0-Very Inefficient to 10=Very Efficient. The results by company designations are noted below:

TABLE 13

AVERAGE ESTIMATE OF EFFICIENCY OF

DOWNWARD ORGANIZATIONAL COMMUNICATION

(N=208)

Company	Average Estimate
Company A	54%
Company B	50%
Company C	54%
Company D	60%
TOTAL	55%

As can be seen, the average estimate of organizational communication efficiency for the total group is 55%, with relatively little difference in estimates among the four companies represented in this survey. However, when the data

are broken down by job level, one group—senior managers and senior scientists—estimate the organizational communication efficiency at 72%, twenty points higher than do respondents at the other three levels.

5.3 The third sub-question in this area asked respondents to "rank the relative importance to you personally of the 5 lines of communication below (1=most important to you and your work, and 5=least important to you and your work)." The results are as follows:

TABLE 14

RANK OF COMPARATIVE IMPORTANCE OF FIVE DIFFERENT COMMUNICATION FLOW DIRECTIONS

(N=208)

Communication Flow Direction	Rank Score	Rank
UP (To your boss or managers above your level)	1.8	1
DOWN (To your immediate subordinates or individuals below your level)	2.6	2
ACROSS (To your peers or colleagues on about the same level as you)	2.6	3
CROSS-LEVEL (To positions which cut across levels and departments)	3.4	4
OUTSIDE (To clients, suppliers, companies outside your company	3.9	5

The data in all companies conform with general expectations of communication flow in technologically intensive companies. The highest ranked direction flows are up to superiors, followed by communication to subordinates and across to peers and colleagues at about the same level, tied for second rank. Cross-level communications to positions which cut across organizational

levels and flows outside to clients, suppliers, and companies were ranked fourth and fifth, respectively.

5.4 The fourth sub-question in this area inquired about informal organization communication in each company. Respondents were asked: "To what extent is the 'grapevine,' the informal communication channels in your organization, important to you in receiving and checking up on information of all kinds?" Respondents were again asked to check an eleven-point scale, ranging from 0=Not Important to 100=Highly Important. The results by company designation are noted below:

TABLE 15

AVERAGE ESTIMATES OF IMPORTANCE OF INFORMAL COMMUNICATION CHANNELS

Company	Average Estimates
Company A	64%
Company B	72%
Company C	64%
Company D	56%
TOTAL	64%

The general results indicate that the informal communication channel is felt to be of above average importance as an adjunct to the formal organizational communication system, with an overall rating of 64%. When broken down by job level, the "grapevine" is felt to be more important to lower-middle management groups who rate its importance at 70% as compared to the other three levels who rate its importance around 55%.

CONCLUSIONS AND INTERPRETATIONS

The demographic data revealed that respondents were predominantly older, more experienced managers and technical professionals, who had been working on the average for over twelve years in total, about nine years in the company surveyed, for nearly three years in their present position. All but five indicate they had some managerial or technical supervisory responsibility, with approximately 53% designating themselves as lower middle management/technical professional, 30% as middle management/technical professional, 10% as upper middle management/technical professional, and 10% as senior management/technical professionals. They were a fairly well-educated group with only 8% with less than a four-year degree, 47% with a B.S. or B.A. degree, 27% with a master's degree, and 18% with a Ph.D. The job level, educational background, and work experiences of the respondents presents a profile which is probably generally representative of the organizational hierarchy in many large-scale, high-technology companies.

Turning to the results, several conclusions warrant comment. The amount of general communication activities these respondents estimated they engaged in each week is on the high side compared with similar surveys taken in other environments. In total they report that they were engaged in business-related types of communication for approximately 83% of their working day, presumably spending the other 17% in non-business, social, or personal activities. Although one must always question individual self-assessment and the tendency to overestimate or underestimate total time spent on various activities compared with date obtained from more rigorous observational studies, nontheless these estimates do not appear to be unreasonable.

Clearly the dominant mode of communication for this group was oral

communication of various kinds in which they spent two-thirds of the total communication time, compared to one-third spent working in a written communication mode—decoding, encoding, and analyzing written documents of some kind. Overall, this general communication activity profile more closely approximates the findings of Mintzberg [8] concerning top level executives than it does the results of Erickson's [9] study of technicians who spent only 30% of their time in oral communication activities. Other conclusions as well as some questions flow from the data on comparative communication activities. In general, these data follow conventional expectations, although the amount of time spent on small group conferences of three or more people, approximately 12%, appears to be somewhat lower than expected compared with findings in other studies. The amount of time spent in person-to-person or dyadic communication, approximately 24%, is clearly dominant but not surprising. However, when coupled with telephone communication, we find this group spending about 37% of their total time each week in dyadic communication. The fact that this group spent over 50% of their communication time in the three areas of person-to-person, telephone, and small group communication would seem to reflect the greater need for extensive coordination of information with and between work groups in high-technology industries.

A more provocative finding concerns the relative ranking of these communication activities in terms of their perceived importance to the jobs of the respondent group. While person-to-person communication is ranked of first importance by a wide margin, the two activities which accounted comparatively for the least amount of time—small group communication and managerial and technical presentations—were ranked second and third, respectively. Clearly, the activities perceived to be the most important to their jobs are all oral

communication activities. The findings with regard to presentations seems to contradict the findings of DiSalvo, et al. [10] who found public speaking consistently ranked near the bottom of their list of some ten communication skills related to job success.

It appears that more experienced middle managers and technical professionals would be wise to appreciate the importance of presentations despite their relative infrequency. One engineer summarized the general consensus of his pre-test group on this issue by saying, "These events are fairly infrequent, but managerial and technical presentations are one of the most critical and highly visible communication acts we engage in each month. I've known people in this corporation who have been promoted or not promoted primarily on the basis of one fifteen-minute exposure to higher management." At least as this finding applies to the preparation of personnel going into high-technology industry, it does call into question the conclusion of Hanna [11] who suggested, based on the recommendations of fifty-five chief executive officers, that teachers should place less emphasis on training in formal presentations.

Information on the specific types of presentations used most frequently in high-technology industries may also be useful to instructors and curricula builders preparing students for these careers. The typical respondents made six presentations a week of about one-half hour each. The two most frequent presentation types were the program review, reporting scheduled progress against some planned program or project, and the internal sales presentation, selling new programs within the company. While typical assignments undoubtedly prepare students well for some presentation types such as sales or demonstration speeches, one of the most prevalent types of presentation

reported, the program review, is seldom found in typical business and professional speaking curricula.

The data on the average length of each of these presentations, approximately one-half hour, is also of interest to teachers of business and professional speaking. Because of the current exigencies of enrollment pressures and tighter staffing surrounding public speaking instruction, it is doubtful that many students ever have the opprotunity to prepare and deliver a thirty-minute presentation. It may well be that some departments, particularly in schools of engineering and technology, might well consider requiring fewer but longer presentations patterned after those found in high-technology industries.

The data on small group conferences shows that meetings remain a constant feature of the manager or technical professional's life. Respondents attended on average about seven meetings each week, including after-hours or dinner meetings, which accounted for approximately eight hours per week of their lives. While brief staff meetings remain an important administrative tool, problem-solving meetings and interdepartmental meetings take up most of the respondents' meeting time. The relative frequency of interdepartmental meetings underlines the growing importance of liaison interaction in these organizations. These individuals spend as much time coordinating program activities with colleagues in other departments, work groups, or scientific disciplines as they do in internal department staff meetings.

Global judgments of these meetings concerning their efficiency in meeting their goals within allotted meeting time, and of their perceived level of satisfaction with meeting process and outcomes, were uniformly low (47%). This global judgment is specified by responses to the five most frequently mentioned

meeting problems: "getting off the subject," "no goals or agenda," "too long," "poorly organized," "little results." This generally dismal picture of meeting management is hardly unique to high-technology industries. Similar findings appear in virtually every study of small groups in industry.

Results of several studies surveyed by DiSalvo, Dunning, and Homan [12] place training in small group conference methods high on the list of communication skills recommended by executives, middle managers, and entry level professionals. Yet it is probable that a very small percentage of graduates entering these industries each year have been trained in these critical skills. These data are of concern not only to university communication departments charged with appropriate training of their students; they should also be of major relevance to all businesses concerned with time-management and cost-effectiveness, because group meetings incur the highest costs of all communication activities. In a recent estimate based upon an earlier interview study of the communication activities of one division in one of the companies surveyed, the author estimated that $48 million was wasted by that company each year in inefficiently planned and ineffectively conducted meetings.

Concerning person-to-person communication activities, the clearly predominant activity was job instructions, planning, coordinating, and feedback, with over ten meetings a week. Far less frequent was the second-ranked category of "responding to work-related grievances, gripes, criticism, and lack of motivation," averaging 2.2 meetings a week. Many respondents pointed out that although career counseling, management development discussions, job performance appraisals, and interviewing prospective job candidates were comparatively infrequent dyadic events, they were considerably

more important events than were routine job instruction or grievance processing. Job performance appraisals in particular were thought to be potentially critical communication events which required specific training, most appropriately by host companies rather than by universities or colleges.

The three questions directed at assessing factors of organizational communication all seemed to uncover typical findings. Respondents perceived progressively more formality as the organizational units assessed became larger and more distant. Estimates of the efficiency of the organizational structure in getting important information from the top down to the level of these respondents seemed to support the general ineffectiveness of formal organizational communication systems noted by numerous researchers. Respondents in this survey estimated an overall efficiency of 54% which leaves a good deal to be desired. However this figure is considerably higher than the findings of Allen [13] based upon research in a similar research and development environment when he cites "the appalling evidence that only 20% of a downward message ever reaches the bottom organizational level."

A number of studies have shown the progressive deterioration in the accuracy or understanding of information as it flows downward to each level of the formal organization. When these data are broken down by level of job responsibility, we see a similar pattern emerging: those at the highest organizational level present much higher estimates of the organizational communication efficiency (72%) than do those at the lower levels (55%). Improving both the perception and the reality of organizational communication appears to remain a challenge for high-technology industries as well as for organizations of all types.

The data on the comparative importance of direction in communication flows

support the observation made by many researchers that in large-scale, highly-specialized, interdependent, decentralized, and technologically-intensive industries, there is far greater need for coordination and cooperation within and between work units. Respondents in this study not surprisingly ranked communication upward to their immediate supervisor as first in importance. However, horizontal communication to peers and colleagues, and communication downward to subordinates were tied for second in importance to them. This communication pattern closely resembles the "organic" structure first noted by Burns and Stalker [14] as a more consultative, advisory style of communication with a high degree of horizontal communication. The importance of horizontal logically parallels the development of larger, more decentralized and specialized organizations using more advanced technologies. It also may reflect the typical work styles of scientists, engineers, and managers in information-intensive environments: greater informality and collegiality, with fewer constraints and more managerial discretion. This greater degree of communication freedom was epitomized by one respondent who stated, "We have only one official organizational communication policy that I am aware of. It is that we have the freedom to contact anyone at any level or in any division of this company who can help us solve our problem, without first clearing it with the boss."

Finally, the estimate of the importance of informal communication channels, the "grapevine," proved fairly important to these respondents. The use of the grapevine in receiving and checking up on information of various kinds received a relatively high rating of 64%.

In summary, one is impressed with the scope, frequency, and balance of communication activities of the manager and technical professional in

high-technology industries. They are actively engaged each day and week in a broad range of oral and written communication activities. There is little difference between the general communication profile of a scientist or engineer on the technical ladder and the profile of a marketing or administrative executive on the management ladder. The two-to-one frequency and perceived importance of oral communication activities over written communication activities resembles most the communication profile and preferences of corporate CEOs and senior vice-presidents. If organizational futurists are correct in predicting that 80 to 90% of future graduates will work in informative-processing organizations similar to those surveyed, we would do well to re-examine our current methods of preparing individuals for the types of communication practices they will encounter in these careers and organizations.

FOOTNOTES

[1] H. Zollitsch and R. Krusing, "Business Executives' Expectations of Business Administration Graduates: A Marquette Survey," Marquette Business Review, 14:4 (1970).

[2] B. J. Bennett, "The Communication Needs of Business Executives," Journal of Business Communication, 8:3 (1971).

[3] V. DiSalvo, D. Larsen, and W. Seiler, "Communication Skills Needed by Persons in Business Organizations," Communication Education, 25:4, 269-276.

[4] M. Hanna, "Speech Communication Training Needs in the Business Community," Central States Speech Journal, 29 (1978).

[5] H. Erickson, "English Skills Among Technicians in Industry," in T. Wirkus and H. Erickson, Communication and the Technical Man, (Englewood Cliffs, NJ: Prentice-Hall, 1972).

[6] S. Fitch, "Communication Education for the Research Scientists," Communication Education, 29 (1980).

[7] R. Mosvick, "An Exploratory Study of Selected Aspects of Organizational Communication in One Division of a Large Midwest-Based Company," unpublished manuscript, Macalester College, 1975.

[8] H. Mintzberg, "The Manager's Job: Folklore and Fact," Harvard Business Review (July-August, 1975).

[9] Erickson.

[10] DiSalvo, Larson, and Seiler.

[11] Hanna.

[12] V. DiSalvo, D. Dunning, and B. Homan, " An Identification of Communication Skills Problems and Issues for the Business and Professional Communication Course," paper presented at the Central States Speech Association Convention, April, 1982.

[14] T. Burns and G. Stalker, The Management of Innovation (London: Tavistock Publications Ltd, 1961), 119-125.